

DISCUSSION OF THE AMENDMENT

Due to the length of the specification herein, Applicants will cite to the paragraph number of the published patent application (PG Pub) of the present application, i.e., US 2007/0148374, when discussing the application description, both in this section and in the Remarks section, *infra*, rather than to page and line of the specification as filed.

Claims 1 and 30 have each been amended by inserting that -- the one or more dopants producing the mark of origin or fingerprint do not produce a perceptible color under normal viewing conditions,--, as supported in the specification at paragraphs [0058] and [0059], and by inserting --wherein the mark of origin or fingerprint is provided in the form of one or more layers or regions grown into the CVD single crystal diamond material during synthesis--, as supported by Claims 3 and 75, respectively. Claim 30 has been further amended as supported by Claim 1. Claims 3 and 75 have been canceled.

No new matter is believed to have been added by the above amendment. Claims 1, 4-30, 32-40, 44-53 and 76-79 are now active in the application; Claims 54-74 stand withdrawn from consideration.

REMARKS

The rejections of Claims 1, 3-9, 11, 21-26, 29-35, 44-49, 51-52 and 75-79 under 35 U.S.C. § 103(a) as unpatentable over WO 03/014427 (Linares et al) with Wang et al, *Gem-Quality Synthetic Diamonds Grown by Chemical Vapor Deposition (CVD) Method* (Wang et al), and of the remaining active claims as unpatentable over Linares et al and Wang et al in view of other applied prior art, are respectfully traversed.

Applicants incorporate by reference all the arguments made in the previous amendment in traversal of the above-applied prior art to the extent this art was applied therein.

The Examiner finds that Linares et al discloses boron doping of CVD diamond material, that doping of the diamond structure by dopant atoms increases the average distance between carbon atoms, **and thus these marks made by dopants would only be viewable under special viewing conditions.** (Emphasis by Applicants.)

In reply, the above-emphasized finding is clearly erroneous. Indeed, the Examiner at page 4 of the Office Action admits that boron doping is known to impart a blue coloration to diamond crystals and at page 16 thereof that the introduction of dopants into the crystal lattice will inherently produce strain and this strain causes diamonds to have a change in color. As such, it is clear that the boron doping as described by Linares et al would result in a blue coloration and thus would clearly be visible under normal viewing conditions.

The following replies to the Examiner's Response to Arguments.

At pages 15 to 17 of the Office Action, the Examiner now appears to be suggesting that even if the boron doping of Linares et al causes a blue coloration, such a marking would be visually undetectable versus that of any other blue diamond.

In reply, the claimed invention does not recite that the marking is visually undetectable only relative to another diamond. Rather, the claimed invention recites that the

marking is visually undetectable under normal viewing conditions. Specifically, Claim 1 requires:

- (1) introducing in a controlled manner one or more chemical dopants into the synthesis process in order to produce a mark of origin or fingerprint ; and
- (2) the concentration of the one or more chemical dopants is such that the mark of origin or fingerprint is not visually detectable under normal viewing conditions.

If the boron doping of Linares et al is equated with the one or more chemical dopants producing the mark of origin or fingerprint according to requirement (1), then this does not meet requirement (2) as the boron doping of Linares et al produces a blue colouration which is clearly detectable under normal viewing conditions.

The Examiner has suggested at page 16 of the Office Action that the boron doping of Linares et al does not change any of the 4Cs (color, clarity, cut and carat). However, clearly the boron doping of Linares et al is at sufficient levels to produce a blue coloration.

At page 17 of the Office Action, the Examiner appears to seek to decouple the blue colouration from the mark of origin or fingerprint. Boron doping as disclosed by Linares et al produces a visible blue colouration but also produces an orangy luminescence which is only visible under special viewing conditions. As such, the Examiner suggests that the fingerprint in Linares et al is not the visible blue colouration but the orangy luminescence. While this is arguable, Claim 1 also requires that the concentration of dopant is such as to not affect the perceived quality of the diamond under normal viewing conditions. Clear the blue colouration would fall run afoul of this requirement.

Nevertheless, Claims 1 and 30 have each been amended to require that the one or more dopants producing the mark of origin or fingerprint do not produce a perceptible color under normal viewing conditions. Thus, while Applicants submit that the Examiner has misinterpreted the scope and meaning of the mark or fingerprint, it is now even more clear

that the claims exclude dopants which produce a perceptible blue color but which also luminesce under special viewing conditions.

The Examiner relies on Wang et al for a disclosure of CVD diamonds used as gemstones. At page 16 of the Office Action, the Examiner suggests that any CVD diamond will include defects which could function as a fingerprint, relying on Wang et al.

In reply, such defects are not chemical dopants which are introduced in a controlled manner as required by Claim 1 to function as a mark of origin or fingerprint. Indeed, the distinctive strain pattern of CVD diamond material described by Wang et al is due to the formation of dislocations propagating in the growth direction of the CVD diamond material to form a parallel network of dislocations with a distinctive strain pattern. Dislocations are crystal defects and not formed by controlled addition of chemical dopants. As such, these defects are not relevant to the presently-claimed invention, which is directed at forming marks/fingerprints using controlled chemical doping. Controlled addition of chemical dopants into CVD diamond gemstones in the prior art is to produce a perceptible change in the diamond material under normal viewing conditions which is completely contrary to the presently claimed invention.

For all the above reasons, it is respectfully requested that the rejections be withdrawn. The rejection of Claims 1, 3-5, 8-11, 17, 20-40, 44-48, 51-53 and 75 under 35 U.S.C. § 102(e) as unpatentable over US 2004/0180205 (Scarsbrook et al) with Wang et al as an evidentiary reference, is respectfully traversed.

Scarsbrook et al is drawn to obtaining uniform boron doped single crystal diamond material, and particularly applications of boron doped diamond where uniformity in the color, luminescence, or other properties associated with boron doping are advantageous. The boron doping disclosed therein will generally produce a blue coloration (with highly doped boron material being opaque and black in color). Scarsbrook et al further discloses that their CVD

single crystal boron doped diamond may also contain nitrogen as a dopant and that the diamond will generally contain a nitrogen concentration no greater than 1/5 of that of the boron concentration, and preferably less than 1/50 of that of the boron concentration. The Examiner finds that the nitrogen dopant could act as the mark or fingerprint of the presently claimed invention.

Wang et al is here relied on for a disclosure that certain doping, such as nitrogen doping, in CVD diamond can be detected only under special viewing conditions due to luminescence but not under normal viewing conditions.

In reply, the above-amended claims now require that the mark of origin or fingerprint be provided in the form of one or more layers or regions grown into the CVD single crystal diamond material during synthesis, which clearly distinguishes over material which incorporates low levels of dopant in a uniform manner throughout the material, as in Scarsbrook et al. Scarsbrook et al neither discloses nor suggests providing their nitrogen dopant only in particular layers or regions, let alone so as to act as a mark of origin or fingerprint. Wang et al does not remedy these deficiencies of Scarsbrook et al since it discloses and suggest nothing about so confining a dopant. Accordingly, it is respectfully requested that the rejection be withdrawn.

The rejection of Claims 13-16 and 19 under 35 U.S.C. § 103(a) as unpatentable over Scarsbrook et al with Wang et al in view of a reference to Musale, is respectfully traversed.

Musale has not been made of record so that it is impossible for Applicants to respond to this rejection. To the extent this rejection is repeated in the next Office Action, the Office Action **cannot be made Final**. Nevertheless, based on the claims that have been rejected over Musale in part, it is presumed that Musale does not remedy the above-discussed deficiencies in the combination of Scarsbrook et al and Wang et al. Accordingly, it is respectfully requested that the rejection be withdrawn.

Application No. 10/582,707  
Reply to Office Action of August 29, 2011

The rejection of Claims 76-77 and 79 under 35 U.S.C. § 103(a) as unpatentable over Scarsbrook et al, is respectfully traversed.

As discussed above, Scarsbrook et al provides uniform doping throughout their single crystal diamond material. Without the present disclosure as a guide, one of ordinary skill in the art would not have confined their doping to particular layers or regions, let alone so as to act as a mark of origin or fingerprint. Accordingly, it is respectfully requested that the rejections be withdrawn.

All of the presently-active claims in this application are now believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.



Harris A. Pitlick  
Registration No. 38,779

Customer Number  
**22850**

Tel: (703) 413-3000  
Fax: (703) 413 -2220  
(OSMMN 08/07)